Victoria's butterflies in a national conservation context

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Abstract
Comments are given on the conservation status of Victoria's butterflies, summarising and bringing up-to-date the information previously available in published documents. (*The Victorian Naturalist* **124** (4), 2007, 243-249)

Introduction

The Action Plan for Australian Butterflies (henceforth Butterfly Action Plan, BAP) (Sands and New 2002) is the only published attempt to assemble and assess information on the conservation status and needs of an entire natural group of invertebrates in Australia. It contains dossiers on 220 species or subspecies flagged for some conservation interest in Australia, and reviews all species and subspecies occurring in the region. The information was derived from published sources and from wide consultation, including workshops in all States and Territories, which were attended by many of the country's most experienced and knowledgable butterfly enthusiasts. This broad treatment allows us to consider the current status of the butterflies flagged for conservation significance in Victoria, some listed under the Flora and Fauna Guarantee Act 1988, in the wider national context. We indicate more recent information on a few taxa, and note also the account by Field (1995) in which he commented on 21 Victorian taxa that he believed to have declined in the state over the previous century.

The butterflies

The 12 taxa reported in BAP as threatened in Victoria (Table 1) are all members of major endemic butterfly radiations in Australia (New 1999), within the Hesperiidae (4 taxa), Nymphalidae (1) and Lycaenidae (7). Several of these are distributed far more widely in Australia, and their conservation interest in Victoria is essentially state-based. The Small Ant-blue *Acrodipsas myrmecophila*, for example, occurs widely elsewhere but is known currently from only one isolated colony in Victoria, at Mount Piper, Broadford (Jelinek 1995; New and Britton 1997). This population appears to be separated from any other by at least several hundred kilometres, and merits conservation as an isolated outlier of the species in a region where other colonies are known to have become extinct due to loss of habitat. This situation differs markedly from a 'politically isolated' population simply marking the edge of a large continuous range by extending narrowly into the state.

It is important to note that these 12 taxa were categorised on the basis of definable threats, rather than simply for their rarity, even though rarity may be a predisposition to threat in some cases. Other taxa, such as *Oreixenica latialis theddora*, endemic to the Mount Buffalo plateau, were reported as 'Lower Risk (Near threatened)', because tangible threats were not easily definable. This butterfly is abundant and widespread on Buffalo, itself a national park in which butterfly management (if needed) could be undertaken within a secure habitat. However, for any such isolated species, stochastic events such as bushfires may be devastating, but their effects very difficult to predict. Other than fire (with the outcomes of recent fire on the plateau not yet known) the main possible threat to *O. l. theddora* may result from contraction of the alpine area through global warming. Contraction of range is an important potential indicator for such changes on the plateau, but it is indeed difficult to formulate constructive conservation management for such an eventuality for species that appear already to be on the 'extreme edge' of their potential range.

Table 1. Butterflies in Victoria ranked as threatened at either national or state level in BAP

Taxon	Conservation status	FFG listed
HESPERIIDAE		
Hesperilla flavescens flavescens	Vulnerable	Yes
H. idothea clara	Vulnerable in South Australia	No
Telicota eurychlora	Threatened in Victoria Vulnerable in Queensland	Yes
Trapezites phigalia	Vulnerable in South Australia	No
NYMPHALIDAE		
Heteronympha cordace wilsoni	Critically endangered	Yes
LYCAENIDAE		
Acrodipsas brisbanensis cyrilus	Vulnerable	Yes
A. myrmecophila	Endangered in Victoria	Yes
Candalides noelkeri	Endangered	Yes
Ogyris idmo halmaturia	Endangered	Yes
O. otanes	Endangered in Victoria	Yes
O. subterrestris subterrestris	Vulnerable in South Australia and Victoria	Yes
Paralucia pyrodiscus lucida	Vulnerable	Yes

Table 2. Butterflies recorded in Victoria but which are regarded as of 'Lower risk' (LR), 'Data deficient' (DD), or for which main conservation concerns are elsewhere. Range states/territories are given by initial letters.

Taxon	Range	Conservation concern	FF listed
HESPERIIDAE			
Hesperilla chrysotricha leucosia	SA,V	LR (SA)	No
Trapezites eliena	Q, NSW, ACT, SA,V	LR (SA)	No
T. luteus luteus	SA, V	LR (SA)	Yes
T. symmomus soma	SA, V	LR (SA)	No
NYMPHALIDAE			
Oreixenica kershawi kanunda	SA, V	LR; Vulnerable in SA	No
O. latialis theddora	V	LR	Yes
O. lathoniella herceus	NSW, ACT, SA, V	DD (SA)	No
LYCAENIDAE			
Acrodipsas brisbanensis brisbanensis	WA, Q, NSW, ACT, V	DD (WA)	Yes (as species)
Hypochrysops ignitus ignitus	Q, NSW, SA, V	LR (SA,V)	Yes
Jalmenus icilius	WA, Q, NSW, ACT, SA,V	LR (V)	Yes
Nacaduba biocellata biocellata	WA,NT,Q,T,NSW,SA,V	DD (T)	No
Pseudalmenus chlorinda zephyrus	T, NSW, ACT, V	LR (T)	No
Theclinesthes albocincta	WA, NT, Q, NSW, SA,V	DD (Q)	Yes

This, and other 'lower risk' or 'data deficient' taxa (the latter being those for which available information is insufficient to formulate sound inference) are noted in Table 2: most are of little current concern in Victoria. All are members of the same taxonomic groups represented in Table 1.

In this note, we comment on several of the threatened species in Victoria, to exemplify the range of concerns arising from BAP, and to note some advances from that time. One of the taxa, the Eltham Copper *Paralucia pyrodiscus lucida* (a subspecies endemic to Victoria) is treated separately in this issue of *The Victorian Naturalist* (Canzano *et al.*, this issue). The Eltham

Copper is an important flagship for invertebrate conservation in the state.

The threat categories noted in Table 1 are 'critically endangered' (most serious), 'endangered', and 'vulnerable'.

Notes on selected taxa

Critically endangered

Heteronympha cordace wilsoni. This narrowly distributed satyrine is the only Victorian butterfly given this status. It is known only from the far south west of Victoria (around the mouth of the Glenelg River) and a small abutting area of far south-eastern South Australia, and at the time of BAP had not been recorded for some time – the most recent records were in 1980 (Victoria) and 1976 (South Australia), and there were fears that it might have become extinct as a consequence of continued habitat degradation in the area. Caterpillars feed on species of *Carex*, and the major factor in the butterfly decline has been drainage and clearing of the wetlands in which the host plant grows, with subsequent further degradation through overgrazing by cattle. This has led to some former sites being unlikely to host the butterfly in the future. Historically-extant populations were generally small, localised, and presumed to be closed, as adult butterflies appeared to disperse little, so that small dedicated reserves may be the key for conservation. The major recommendation of BAP was to instigate surveys throughout its historical range to determine whether *H. c. wilsoni* still exists, as a prelude to providing effective protection for any populations found.

A small colony was discovered in South Australia in 2004-2005, with its presence described as 'precarious' (Grund 2006) and reported formally by Haywood and Natt (2006). Grund (2006) noted also that the butterfly has reappeared within the last two seasons at formerly occupied *Carex* marsh sites, in both southeastern South Australia and western Victoria. Further investigations may lead to downgrading of status to 'endangered'.

Endangered

Candalides noelkeri, known from two small saline sites in inland western Victoria, is (as noted above) significant as the state's only endemic butterfly species. Before its recent formal description (Braby and Douglas 2004), it was referred to (e.g. in BAP) as *Candalides heathi* ssp. 'Wyn Wyn' or 'Wimmera form'. The two known breeding sites are about 3 km apart, and they occupy collectively about 3 ha. Both sites are now conservation reserves: Lake Wyn Wyn Wildlife Reserve is managed by Trust for Nature, Victoria, and Oliver's Lake Flora Reserve by Parks Victoria and private landowners. Caterpillars of *C. noelkeri* feed only on *Myoporum parvifolium* in small areas of floodplains between saline lakes and adjacent woodland.

Major threats are site invasions by *Melaleuca halmaturorum*, creating dense shade and reducing the habitat occupied by *Myoporum* and (at Wyn Wyn) also by Horehound *Marrubium vulgare*. Although Sands and New (2002) suggested that rising salt levels pose a further threat, this was not considered likely by Braby and Douglas (2004). However, with such narrow distribution, and additional searches not yet revealing any further populations, intensive site management may be needed to conserve the butterfly.

Ogyris idmo halmaturia (possibly a distinct species, rather than a subspecies) is known from South Australia and Victoria. Other than a sighting in the Grampians in 1970 (Douglas 1995), it has not been seen in the State since 1945, with the only known colony (near Kiata, Little Desert) lost by clearing vegetation for agriculture. It was rediscovered in South Australia only in the mid 1990s (Hunt *et al.* 1998), with three colonies reported. It is Endangered in both range states. Surveys are needed to attempt to confirm whether the butterfly still exists in Victoria.

The caterpillars associate with *Camponotus* ants nesting around the base of eucalypts and other trees. However, unlike most other species of *Ogyris*, these larvae may be entirely predatory, and feed on the ant brood rather than on mistletoes, which are generally absent from trees supporting *Camponotus* nests.

Ogyris otanes. This species has a wider geographical range than most taxa noted here, but the South Australia/Victoria populations constitute a distinct 'form' (Dunn and Dunn 1991; Williams and Hay 2001).

In South Australia, it occurs sporadically in the southern temperate mainland areas, mainly in mallee country where the larval food plant *Choretrum glomeratum* grows, and on Kangaroo Island. It has become rare on the mainland due to vegetation clearing. Although apparently secure on Kangaroo Island, it is Vulnerable on the mainland (Grund 2002).

In Victoria, the food plant is *Choretrum spicatum* and, as elsewhere, the caterpillars associate with *Camponotus* ants. Its persistence in Victoria needs confirmation. The main known population (in the Big Desert) may be extinct, and butterflies have not been seen there since 1977. The few other Victorian records are also from the Big Desert region. Increased targeted surveys, perhaps focusing on the scattered patches of *C. spicatum* (as recommended by Douglas 1995), are needed to confirm its presence.

Acrodipsas brisbanensis cyrilus is another lycaenid known only from South Australia and Victoria. Its separation from the nominate subspecies is regarded as questionable by some workers, because of substantial individual variation in the adult butterflies. The few populations regarded as this subspecies occur in remnant woodland/forest patches, some close to Melbourne, but very little is known of its developmental biology. As with *A. myrmecophila*, caterpillars associate with *Papyrius* ants, and live within the nests. Many of the records are of hill-topping adults, and their breeding sites remain unknown.

The single known site in south-eastern South Australia is said to be secure. However, the butterfly has not been seen there since its original discovery, and burns of nearby areas have created some uncertainty over its continued existence (Grund 2004). The major Victorian population is within the Little Desert NP (Douglas 1995). An apparently well-established colony there may afford the best opportunity for study to clarify basic biology. Several former colonies of the butterfly elsewhere have been lost, including some close to Melbourne that have succumbed to urban development (New and Sands 2002).

Acrodipsas myrmecophila was noted earlier. It was regarded in BAP as secure over most of its extensive Australian range, but Data Deficient in the Northern Territory and Endangered in Victoria. It is thus of considerable state significance. Caterpillars live within nests of *Papyrius* ants ('coconut ants') and feed on the ant brood.

Most knowledge of the species in Victoria is derived from a now extinct colony at Ocean Grove and more recently from a population at Mount Piper. The latter led to some innovative suggestions for management, such as the use of wooden trap nests to enhance ant colonies and for use as possible translocation units for the butterfly (Britton 1997). In the future, it may be practicable to use knowledge of the butterfly from studies elsewhere in its range to improve conservation management in Victoria.

Vulnerable

Three butterfly taxa are listed as Vulnerable in Victoria in BAP.

Hesperilla flavescens flavescens is one of two subspecies of an endemic skipper, itself a member of a species complex. In common with the South Australian *H. f. flavia*, it is associated with small wetland sites supporting the larval food plant sedge *Gahnia filum*. The subspecies name is applied to the distinctive clinal 'yellow form' characteristic of a few populations near Melbourne, with the common epithet of 'Altona skipper' emphasising this localised distribution over a few swamps from Point Cook to the Altona region. Threats have broadly reflected urbanisation (New and Sands 2002), and a variety of conservation needs were summarised by Crosby (1990) and in BAP. Recent management at two key localities, Point Cook and Truganina Swamp, has included plantings of *Gahnia* to extend the range and counter the slow natural recruitment of the host plant population (Savage 2002).

Ogyris subterrestris subterrestris has historically been confused with *O. idmo*, and is known from Victoria, New South Wales (a single record near Broken Hill) and South Australia (three sites). Pending its recent description (Field 1999) it was listed in Victoria as '*Ogyris* sp. aff. *idmo*'. A second subspecies occurs in Western Australia. In Victoria it is restricted to the far north-west, around Mildura and in the Hattah-Kulkyne and Murray-Sunset NPs,

where it is associated with *Camponotus* ants. It appears always to have been scarce, with probable declines due to vegetation clearing and overgrazing by sheep (Douglas 1995), as well as wider general disturbance which might lead to loss of *Camponotus*. A broad current biological knowledge could form the foundation for constructive conservation based on restriction of vegetation clearing around known sites and further targeted searches in the north-west.

Paralucia pyrodiscus lucida occurs in three widely separated areas of Victoria, most famously around Eltham in outer north-eastern Melbourne, where the small isolated occupied sites are important urban remnants demanding continuing management to retain their suitability. The Eltham Copper has received more dedicated conservation attention than any other butterfly in Victoria (see Canzano *et al.* this issue).

The taxa listed in Table 2 are predominantly those whose wide range is associated with greater conservation importance elsewhere than in Victoria. Only *Oreixenica l. theddora* , noted earlier, is restricted to the state. Two others are noted as 'Lower Risk, near threatened' for Victoria, and are noted briefly below.

Hypochrysops ignitus ignitus. The 'Lower risk' status evaluation is shared with South Australia, but this butterfly is one of the most widely distributed *Hypochrysops* in Australia. Substantial habitat loss has occurred in South Australia and Victoria, leading to concerns in those states, with evaluations up to 'Vulnerable' (Grund 2005). Further surveys are needed in Victoria to ensure that sufficient populations are included in major reserves such as national parks, and to secure these adequately against disturbance.

Jalmenus icilius. This species is very widely distributed in many open woodland and mallee communities but is extremely scarce in Victoria, where it occurs only as putative remnant populations following extensive clearing of natural vegetation for agriculture. Douglas (1995) knew of only five Victorian localities, and ranked *J. icilius* as 'Endangered'. The major initial need is for more extensive surveys and, in particular, to confirm (and, if found, secure) its existence in the Grampians NP.

Discussion

Evaluating the status of butterflies for conservation need is never easy, except in clearcut cases of single (or few) populations clearly threatened by tangible impositions whose abatement can be a focus for management. Such management is usually based also on sound biological understanding of the focal taxa, so that good basic research is often a precursor to effective conservation. However, because major gaps in knowledge persist, practical conservation must commonly proceed in its absence. In this case the focus is necessarily often to conserve the habitat or site at which a species occurs as a basis for pursuing more detailed management, should this be needed.

Several of the 18 Victorian butterflies listed under the *Flora and Fauna Guarantee Act* (at July 2006) were not considered threatened in BAP; and no Victorian butterflies are listed for national protection under the Federal Endangered Species and Biodiversity Protection Act 1999. The anomalous Victorian taxa are the skippers *Antipodia atralba* and *Telicota eurychlora*, the satyrine *Hypocysta adiante*, and the lycaenids *Ogyris genoveva araxes* and *Theclinesthes albocincta.* Field (1995) listed several other taxa, but all of those appear to be secure in reserves, or locally well-established.

Antipodia atralba is regarded as naturally rare, but with current distribution suggesting decline (Douglas 1993). It can become common following vegetation regrowth after fires (Braby 2000). *Telicota eurychlora* is known from only one location in Victoria, at the mouth of the Thurra River, where the small isolated population is secure in the Croajingolong NP. *Hypocysta adiante* is common along much of the east coast of Australia, but probably only a 'political vagrant' in Victoria, where it has been reported only from a single record at Cudgewa, close to the northern State border: it has not been confirmed as a breeding resident in Victoria. *Ogyris genoveva araxes* has apparently diminished in abundance and some populations have been lost. However, BAP workshop participants implied that the butterfly is not threatened at present, not least because a number of populations are in reserves. Finally, *T.*

albocincta has been ranked as 'Vulnerable' (Douglas 1995), but conservation may be needed only over parts of the species' extensive range. In Victoria, some key habitats may have succumbed to vegetation clearing and subsequent sheep and rabbit grazing of foodplants.

Other species worthy of note include the skipper *Netrocoryne repanda repanda*, which until recently was known in Victoria from only one specimen. It is now known to be breeding in the Buchan Caves reserve. A distinct form of the lycaenid *Candalides absimilis* is restricted to the south-east corner of Australia, with breeding colonies in the Mitchell River NP and at Buchan. Both these taxa have been found on remnant vegetation and street trees at Buchan.

'Conservation status' is a dynamic condition, often very difficult to confirm and justify, and the criteria used by various workers and in different contexts vary considerably; it can also change rapidly with human influences in the environment. Many other butterflies in Victoria could easily become threatened. For example, recent widespread fires may have caused losses of isolated butterfly populations in many parts of Victoria, but the extent of these effects is at present unknown. The above appraisal is thus open to severe revision. Any such evaluations of threat should be subject to periodical critical review, in order to facilitate adaptive management and the most rational allocation of priority. Butterflies are unusual amongst invertebrates in that such review is indeed possible.

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References

Braby MF (2000) *Butterflies of Australia: their identification, biology and distribution*. CSIRO Publishing: Melbourne.

Braby MF and Douglas F (2004) The taxonomy, ecology and conservation status of the Golden-rayed Blue: a threatened butterfly endemic to western Victoria, Australia. *Biological Journal of the Linnean Society* **81**, 275-299.

Britton DR (1997) Ant trap nests enable detection of a rare and localized butterfly, *Acrodipsas myrmecophila* (Waterhouse and Lyell) (Lepidoptera: Lycaenidae) in the field. *Memoirs of Museum Victoria* **56**, 383-387.

Canzano A, New TR and Yen AL (2007) The Eltham Copper Butterfly, *Paralucia pyrodiscus lucida* (Lycaenidae): local versus state conservation strategies in Victoria. *The Victorian Naturalist* **124**, 236-242.

Crosby DF (1990) A management plan for the Altona Skipper butterfly *Hesperilla flavescens* Waterhouse (Lepidoptera: Hesperiidae) 65 pp. Technical Report Series No. 98, (Arthur Rylah Institute for Environmental Research, Melbourne)

Douglas F (1993) The conservation status, distribution and habitat requirements of diurnal Lepidoptera in central and western Victoria. Part 3: Family Hesperiidae. 62 pp. Report to the Victorian Department of Conservation and Natural Resources, Melbourne.

Douglas F (1995) Recovery plan for threatened diurnal Lepidoptera in western Victoria. Part 2: Family Lycaenidae. 100 pp. Report to the Victorian Department of Conservation and Natural Resources: Melbourne.

Dunn KL and Dunn LE (1991) Review of Australian butterflies: distribution, life history and taxonomy. Parts 1-4. 600 pp. Published privately: Melbourne.

Field RP (1995) Conservation of Victorian butterflies. *The Victorian Naturalist* **112**, 43-46.

Field RP (1999) A new species of *Ogyris* Angas (Lepidoptera: Lycaenidae) from southern arid Australia. *Memoirs of Museum Victoria* **57**, 251-259.

Grund R (2002) South Australian butterflies data sheet. *Ogyris otanes* C.and R. Felder) (Small Bronze Azure). ~rtbg/otanes_ds.htm

Grund R (2004) South Australian butterflies data sheet. *Acrodipsas brisbanensis* (Miskin) (Bronze Ant-blue). ~rtbg/acrodipsas ds.htm

Grund R (2005) South Australian butterflies data sheet. *Hypochrysops ignitus ignitus* (Leach) (Fiery Jewel). ~rtbg/ignitus_ds.htm

Grund R (2006) South Australian butterflies data sheet. *Heteronympha cordace wilsoni* Burns (Bright-eyed Brown). *~erg/cordace_ds.htm*

Haywood BT and Natt V (2006) First confirmed observation of *Heteronympha cordace wilsoni* Burns (Lepidoptera: Nymphalidae: Satyrinae) in South Australia. *The Australian Entomologist* **33**, 5-7.

Hunt L, Moore M and Moore D.(1998) Rediscovery of *Ogyris halmaturia* (Tepper, 1890). *Victorian Entomologist* **28**, 113-116.

Jelinek A (1995) Conservation strategy for a threatened 'butterfly community'. *The Victorian Naturalist* **112**, 47-50.

New TR (1999) The evolution and characteristics of the Australian butterfly fauna. In Kitching RL, Scheermeyer E, Jones RE and Pierce NE (eds) *Biology of Australian butterflies*. Pp. 33-52 CSIRO Publishing: Collingwood)

New TR and Britton DR (1997) Refining a conservation plan for an endangered lycaenid butterfly, *Acrodipsas myrmecophila*, in Victoria, Australia. *Journal of Insect Conservation* **1**, 1-8.

New TR and Sands DPA (2002) Conservation concerns for butterflies in urban areas of Australia. *Journal of Insect Conservation* **6**, 207-215.

Sands DPA and NewTR (2002) *The Action Plan for Australian Butterflies*. (Environment Australia, Canberra)

Savage E (2002) Options and techniques for managing Chaffy saw-sedge (*Gahnia filum*) as habitat for the Altona Skipper butterfly (*Hesperilla flavescens flavescens*). Occasional Paper Series. (Conservation and Environmental Management, Parks Victoria) Melbourne.

Williams MR and Hay RW (2001) Two new subspecies of *Ogyris otanes* C. & R. Felder (Lepidoptera: Lycaenidae) from Western Australia. *The Australian Entomologist* **28**, 55-63.

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